GENERAL TOPICS COVERED IN COURSE

IE 424: DATA PROCESSING OPERATIONS

Database Application Development
SQL Programming
Implementing Database Designs
Delphi Programming
Kylix Programming
Datawarehousing
OLAP
Data Mining

FALL 2002-2003
IE 424: DATA PROCESSING OPERATIONS

COURSE OUTLINE

Classes
Days : Saturday, Monday, Wednesday
Timings : 08:00-08:50

Tutorial
Day : Saturday (??)
Timings : 14:30-17:00

COURSE OUTLINE

Course Outline (General Topics and Weeks)

Database Management Systems	Week 1
SQL Language for Data Processing and Operations	Week 2-3
Implementing Database Designs	Week 4
Database Applications	Week 5
Tools for Building Database Applications	Week 6
Using Delphi and Kylix for Cross-Platform Database Application Development	Week 7-12
Advanced Database Processing Issues	Week 13-14

DETAILED COURSE OUTLINE

Database Management Systems

- Network Database Management Systems
- Hierarchical Database Management Systems
- Relational Database Management Systems
- Object-oriented Database Management Systems
- Popular Database Management Systems

SQL Language for Data Processing and Operations

- Data Definition Language
- Data Manipulation Language
- Data Query Language

DETAILED COURSE OUTLINE

Implementing Database Designs
- Data Modeling and Database Designs
- Steps for Constructing Tables
- Rules for Table and Column Naming
- Data Types
- Constructing Tables
- Column Constraints
- Copying Tables
- ALTERing Tables
- DROPping Tables
- Data Manipulation Language (Insert, update and delete)
- Transaction Processing (Commit and rollback)

DETAILED COURSE OUTLINE

Database Applications
- Transaction Processing Systems
- Management Information Systems
- Decision Support Systems
- Expert Systems

Tools for Building Database Applications
- Visual Languages
- Cross-Platform Application Development

DETAILED COURSE OUTLINE

Using Delphi and Kylix for Cross-Platform Database Application Development

- Integrated Development Environment
- Introduction to Delphi
  - Features
  - Delphi and Other Visual Languages
  - Integrated Development Environment
  - Basic Files
  - Structure of a Delphi Program
- Basics of Language
  - Variables and Data Types
    - Integers
    - Real Numbers
    - Strings
    - Complex Data Types
  - Control Statements
    - IF-THEN Controls
    - CASE Controls
  - Loops
    - FOR Loops
    - WHILE Loops
    - REPEAT-UNTIL Loops
  - Subroutines
    - PROCEDUREs
    - FUNCTIONs

DETAILED COURSE OUTLINE

Delphi and Kylix Components (VCL and CLX components)

- What is a component?
- Visual Components
  - Components in Standard Pallette
  - Components in Additional Pallette
  - Data Access Components
  - Data Controls Components
  - System and Win32 Components
  - Quick Report Components
  - Internet and Fastnet Components
- Non-visual Components
  - Standard, Additional, Data Access, Dialog Components
- Data Aware Components
- Installing 3rd party Components
- ActiveX (OCX) Components
- Writing new Components

DETAILED COURSE OUTLINE

Database Applications
- Understanding BDE
- Constructing Database
- Connection Settings to Database (Alias settings etc.)
- Constructing Tables and Relations using Database Desktop
- Constructing Tables and Relations using SQL
- Using Database Components
  - Using Data Access Components (TDatabase, TTable, TDataSource, TQuery etc.)
  - Using Data Control Components (TDBEdit, TDBGrid, TDBComboBox etc.)
  - Use of Editkey, GotoKey, Setkey
  - Simple Database Form, Master/Child and Master/Child/Child forms
- Delphi on InterBase
- Delphi on Oracle
- Delphi on SQL Server

Reporting Components (Quick Reports and others)
Writing DLL and Components

DETAILED COURSE OUTLINE

Advanced Database Processing Issues

Data Warehouses
OLAP (Online Analytical Processing) Technologies
Multi Dimensional Modelling
Decision Cubes
Data Mining Technologies

Introduction to Delphi

Why Delphi?

- **Borland Delphi has a complete object-oriented nature such as C++ Builder or Microsoft Visual C++**
- **Delphi is *a native code compiler*. Languages like Visual BASIC, PL-SQL (used in Oracle Forms Developer) are 'run-time interpreter'. Run-time interpreters compile and execute the code during run-time.**
- **In independent benchmark tests, Delphi is proven to be 5-10 times faster than Visual BASIC.**
- **Delphi supports 'Exception handling'.**
- **Run-time interpreters (such as Visual BASIC), require *dll* files to compile the code during run-time.**

Introduction to Delphi

Why Delphi?

- **VB and many visual languages do not have royalty free native drivers For database management systems such as IBM DB2, MS SQL Server, Oracle, Informix and InterBase.**
- **Due to Component based nature of language, you can even eliminate the need for the drivers to access many databases.**
- **A Database Engine Called BDE (Borland Database Engine) connect you to most of the databases natively without ODBC.**
- **Delphi code is readable by Borland C++ Builder. Therefore, you can use your Delphi codes and forms under Borland C++ Builder or Kylix.**

Introduction to Delphi

Why Delphi?

- **Code Optimization Feature. Delphi was developed and optimized for developing database applications although it can be used for building any general purpose application. Many objects have dataaware or non-dataaware versions for this purpose.**
- **General Purpose Client/Server database tools are available for many DBMS such as SQL Monitor, SQL Explorer and Database Migration Wizard .**
- **A scalable database capability which is not available in many languages.**
- **Scalable data dictionary support.**

Introduction to Delphi

Why Delphi?

- **Tools such as Oracle Forms Developer do not support other databases natively and are poorer to be used in general purpose applications.**
- **Use of dynamic memory and pointers, and objects that can be created and destroyed during run-time allow developer to handle memory more efficiently.**
- **You can write general purpose VCL and CLX components, DLL files, and OCX components.**
- **Components used under Delphi are embedded within your application (inside EXE file). The components (OCX components) used in other languages such as Visual BASIC have to be delivered with your application usually each requiring a run-time license. They need to be registered on the target platform before use.**

Introduction to Delphi

Why Delphi?

- **Delphi is very suitable for 3rd Party component development.**
- **Dephi is faster in compiling than C compilers (single pass compilation).**
- **Delphi Object Pascal language is very rich language as C; from the points of data types, programming structures, and operators etc.**
- **You can develop *Cross-Platform* Applications (Applications that can be used both under LINUX and WINDOWS Operating Systems). For this Purpose, just compile the same code under Kylix (Kylix is a Development environment using Object Pascal Language and running under LINUX Operating System)**

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Types of Information Systems

4 Types of Information Systems

- Transaction Processing Systems (TPS)
- Management Information Systems (MIS)
- Decision Support Systems (DSS)
- Expert Systems (ES)

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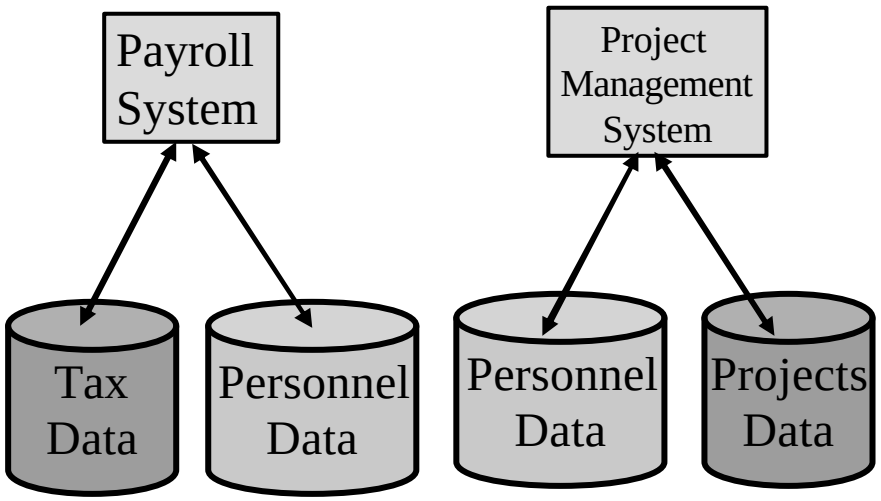
Types of Information Systems

Traditional Approach and Data (User) Oriented Approach



Traditional Approach

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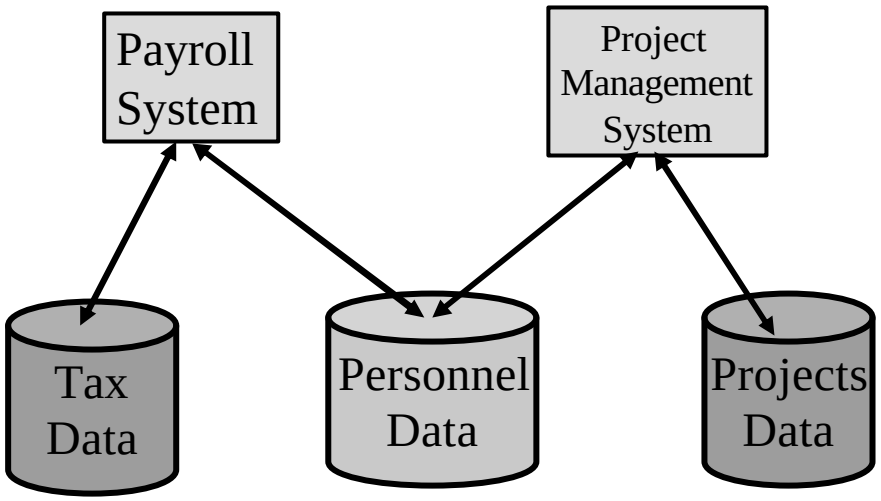
Types of Information Systems

Traditional Approach and Data (User) Oriented Approach



Database Approach

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Types of Information Systems

4 Types of Information Systems

- Transaction Processing Systems (TPS)
  - Automate handling of data about business activities (transactions)
- Management Information Systems (MIS)
  - Converts raw data from transaction processing system into meaningful form
- Decision Support Systems (DSS)
  - Designed to help decision makers
  - Provides interactive environment for decision making

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4 Types of Information Systems

- Expert Systems (ES)
  - Replicates decision making process
  - Knowledge representation describes the way an expert would approach the problem